| Paper | Annotated Abstract |
| --- | --- |
| Geriatric Nursing<br><br>US and Dutch nurse experiences with fall prevention technology within nursing home environment and workflow: A qualitative study<br><br>• Ann E. Vandenberg, PhD, MPH[a, ,]<br>• Bert-Jan van Beijnum, PhD[b],<br>• Vera G.P. Overdevest, MS[b],<br>• Elizabeth Capezuti, PhD, RN, FAAN[c],<br>• Theodore M. Johnson II, MD, MPH[a, d]<br>• [a] Emory University, Department of Medicine, Division of General Medicine and Geriatrics, USA<br>• [b] University of Twente, Faculty of Electrical Engineering, Mathematics, and Computer Science EMCS, Biomedical Signals and Systems, Netherlands<br>• [c] Hunter College of CUNY, Hunter-Bellevue School of Nursing, USA<br>• [d] Birmingham/Atlanta VA Geriatric Research Education and Clinical Center, USA<br><br>Received 22 July 2016, Revised 11 November 2016, Accepted 14 November 2016, Available online 10 December 2016<br><br>http://dx.doi.org/10.1016/j.gerinurse.2016.11.005<br><br>A. E. Vandenberg, B.-J. van Beijnum, V. G. P. Overdevest, E. Capezuti, T. M. Johnson, US and Dutch nurse experiences with fall prevention technology within nursing home environment and workflow: A qualitative study. Geriatr. Nurs. (Minneap)., 1–7 (2016). | As age increases, so does the number of fall-related injuries and the resulting issues. This study examined a method aimed at preventing falls from beds within nursing homes; this was done through utilizing a technology that analyzed physiological patterns in order to predict falls before they occurred. A nursing home in the US (where falls were considered frequent and significant and handled chaotically) was compared to a nursing home in the Netherlands (where falls were not seen in such a serious manner and were handled like they were not a big deal and also in an individualized manner); these nursing homes were matched as closely as possible in both the number of beds and levels of staff. Collected data includes: staff interview data, observations, and facility records. Prevention strategies fell into the three main categories of physical environment, care processes, and technologies. The balance between freedom and safety was discussed. An effective communication system was essential for preventing falls, and having alarms sent to specific nurses was more efficient than general alarms. US systems are fall-reactive whereas the systems in the Netherlands are fall-predictive. It was concluded that the use of technology helped prevent the falls and also resulted in a more efficient and direct response to falls. |

| | |
|---|---|
| WeCareAdvisor™: The Development of a Caregiver-focused, Web-based Program to Assess and Manage Behavioral and Psychological Symptoms of Dementia.<br>Alzheimer disease and associated disorders. ():, Nov 2016<br><br>Helen C Kales; Laura N Gitlin; and 5 more<br><br>DOI: 10.1097/WAD.0000000000000177<br><br>MEDLINE Status: Publisher<br><br>Author Information: *Department of Psychiatry, University of Michigan †Department of Veterans Affairs, HSR&D Center for Clinical Management Research (CCMR) ‡Geriatric Research, Education and Clinical Center (GRECC), VA Ann Arbor Healthcare System #School of Social Work, University of Michigan, Ann Arbor, MI §Department of Community Public Health, School of Nursing // Division of Geriatrics and Gerontology, School of Medicine ¶Center for Innovative Care on Aging, Johns Hopkins University **Department of Psychiatry and Behavioral Sciences, Johns Hopkins Bayview and Johns Hopkins University, Baltimore, MD.<br><br>Kales, H. C., Gitlin, L. N., Stanislawski, B., Marx, K., Turnwald, M., Watkins, D. C., & Lyketsos, C. G. (2016). WeCareAdvisor™: The Development of a Caregiver-focused, Web-based Program to Assess and Manage Behavioral and | This paper had caregivers use technology to track and assess the behavioral and psychological symptoms of dementia without pharmacological interventions. The data was qualitative and aimed at minimizing difficulty of care, as well as training time, and also availability and individualized information (this data was then combined with existing data to create an online support tool for the caregiver). The first bit of the report described the symptoms and prevalence of dementia, as well as many negative outcomes (for both the patient and the caregiver). No pharmacological approaches have been largely successful in treating dementia, and the value of non-pharmacological approaches have been becoming more widely accepted and implemented in recent years. The goal of these approaches is “prevention, symptom relief, and reduction of caregiver distress.” So far only resource-intensive non-pharmacological approaches have been tested and are usually not sustainable for the families. This study aimed to create a web tool to assess the dementia behaviors and how the caregivers handled them (similar to programs available for other chronic diseases). The foundation of the tool was the DICE method (describe, investigate, create, evaluate). Other aspects of the tool examine the caregiver, the patient, and the environment. The tool was developed through caregiver input, obtained through interviews. The average caregiver was described, and also how most of them obtained the information that they knew about dementia. It was also described how most of the caregivers wanted a web-based tool but for the few who didn’t there were concerns about privacy and discomfort using the computer. Frustrations expressed by the caregivers over the technology were also included in the study (wording and juvenile-esque graphics, as well as a lack of human features, were some of the |

| | |
|---|---|
| Psychological Symptoms of Dementia. *Alzheimer Disease and Associated Disorders*. DOI: 10.1097/WAD.0000000000000177<br><br>H. C. Kales et al., WeCareAdvisor t The Development of a Caregiver-focused , Web-based Program to Assess and Manage Behavioral and Psychological Symptoms of Dementia. 0, 1–8 (2016). | main complaints with the format of the technology. They also wanted to be able to interact with it more and provide feedback directly to the program). This study was aimed at providing better care for the dementia patient as well as support for the caregiver. The final leg of the study was a RCT to test the program that was created. |
| Technology: Education and Training Needs of Older Adults<br>Lesa Huber & Carol Watson<br>Pages 16-25 \| Accepted author version posted online: 22 Jul 2013, Published online: 06 Sep 2013<br>• http://dx.doi.org.ezp2.lib.umn.edu/10.1080/03601277.2013.768064<br><br>L. Huber, C. Watson, Technology: Education and Training Needs of Older Adults. Educ. Gerontol. 40, 16–25 (2014). | This paper sums up the results of a survey of older adults: gender, age, familiarity, and education were surveyed for the effects that the variables had on buying preferences, learning methods, and how help was sought. It was conducted due to the growing market for technology in older populations. The use of technology by older adults has risen considerably but there is still a gap; concern is also expressed over the ability to learn how to use the technology. A combination of personal and social factors influence the purchase of technology. Simple (without too many features and easy-to-follow instructions), practical technology applications were the most popular. It was found that there was some significance in the correlation between the four variables (age, gender, education, technology level) and use, familiarity, and help or buying preferences. People feel intimidated to ask for help when they are confused (and sometimes when they think they know how to use it they do not in actuality), but do want to learn. Teaching should be individualized, especially across populations. |
| Factors Influencing the Use of Mobility Technology in Community-Based | This study is examining how the use of technological mobility devices can impact the life of older persons who live in isolation as well as those who live with caregivers. About |

| | |
|---|---|
| Long-Term Care<br><br>Agree, E., Freedman, V., & Sengupta, M. (2004). Factors Influencing the Use of Mobility Technology in Community-Based Long-Term Care. *Journal Of Aging And Health*, *16*(2), 267-307. http://dx.doi.org/10.1177/0898264303262623<br><br>Megan | ⅕ of older persons have difficulty with mobility so technology that can improve their mobility is going to have a large impact on the population of older persons as a whole. The authors evaluated the data from phase two of the 1994-95 National Health Interview Survey Disability Supplements in order to determine which predictors of an older person's lifestyle such as health needs, accessibility, personal access to the technology, as well as family characteristics. The researchers found that in general the type of health ailment that caused a need for the mobility device was the greatest predictor for personal use of the device. A younger age as well as the severity of the ailment can cause the other factors listed above to become more dominant. The researchers concluded that when evaluating the patient's likelihood of using the given mobility device special attention should be paid to age as severity of the ailment as those are the greatest predicting factors.<br><br>This study seemed to focus on the predicting factors that an older person will use this mobility technology when they do not live with a caregiver. The study also found that males who are non-white and have a greater education than high school are more likely than others to rely on solely mobility technology than mobility technology in combination with personal assistance. |
| The Use of e-health and m-health Tools in Health Promotion and Primary Prevention Among Older Adults: A Systematic Literature Review<br><br>Megan<br>Kampmeijer, R., Pavlova, M., Tambor, M., Golinowska, S., & Groot, W. (2016). The use of e-health and m-health tools in health promotion and primary prevention among older adults: a | E-health: “internet medicine” The use of the internet to enhance medical informatics, public health and business health services that improve the treatment of patients. (more patient centered)<br>M-health: “mobile health” use of mobile devices to aid in health care. Ex) phone attachment that can help detect cataracts. http://www.networkworld.com/article/2286628/data-center/75802-10-Examples-of-Mobile- |

| | |
|---|---|
| systematic literature review. *BMC Health Services Research*, *16*(S5). http://dx.doi.org/10.1186/s12913-016-1522-3 | Health-Around-the-World.html#slide2<br><br>Studies that evaluate the technology in older adults tend to focus on implementing technology after cognitive/physical decline has already occurred. This study focuses on using e-health and m-health tools in order to improve the primary health care that older persons receive. This study is a meta-analysis that evaluates 45 publications that use different forms of E/M-health tools that include apps, websites and devices, and video consults. About ⅓ of the 45 publications focused on older adults in general while the other ⅔ of the studies focused on a specific group of older adults (women, overweight/obese and minorities). The study concluded that the use of E/M-health technologies are used to improve the health care of older persons in formal care as well as by the older person outside of a clinic. The meta-analysis mentions that the greatest obstacle that older persons face when implementing this technology into their daily lives is their motivation to use this technology. Another important aspect that affects the older person's use of the technology is their support system.<br><br>Study focused mainly on publications from US or Canada and not a lot from Europe though Europeans face a similar problem as the US in the sense that the percentage of the population considered elderly is increasing. There is not a lot of E/M-health tools being implemented in Europe which must be improved since use of these tools has been shown to improve the quality of care. When designing technological tools/programs for older adults there must be a focus how to motivate the older adults to use the desired technology/program. |

| | |
|---|---|
| What it Takes to Successfully Implement Technology for Aging in Place: Focus Groups With Stakeholders<br><br>Peek, S., Wouters, E., Luijkx, K., & Vrijhoef, H. (2016). What it Takes to Successfully Implement Technology for Aging in Place: Focus Groups With Stakeholders. *Journal Of Medical Internet Research*, *18*(5), e98. http://dx.doi.org/10.2196/jmir.5253<br><br>Megan | Stakeholders: older adults, care professionals, managers of care homes/social work organizations, technology designers and suppliers, and policy makers.<br><br>Most studies that have been conducted seem to focus on how the older adults are able to use technology in a professional setting as well as at home. This study is discussing all the different aspects that are involved with the creation and use of the technology before it is used by an older adults. The study attempts to answer the questions that affect the use of technology before older adults are added into the equation such as what technologies are considered relevant and what the technologies hope to achieve. A consensus between the stakeholder groups over what a successful implementation of technology is:<br>1) older adults needs and wishes are prioritized during the development/administration of the technology<br>2) the technology is accepted by older adults<br>3) The technology provides benefits to the older adults<br>4) Favorable prereqs for use of technology by older adults already exists<br>The overall goal of providing older adults with beneficial technology remains the same between all stakeholders but other aspects, generally more political such as who should be paying for the technology, they disagree on. The stakeholders future goals to successfully implement technology include, collaboration with other organizations, matching technology on an individual basis, change policies, help make technologies more readily available and promote instruction for the use of the technology. Overall the stakeholders have very similar goals but they differ in the way that they go about reaching |

| | |
|---|---|
| | these goals. |
| **Luger TM, Hogan TP, Richardson LM, Cioffari-Bailiff L, Harvey K, Houston TK**<br>**Older Veteran Digital Disparities: Examining the Potential for Solutions Within Social Networks**<br>**J Med Internet Res 2016;18(11):e296**<br>**DOI: 10.2196/jmir.6385**<br><br>Jake | Health Information Technologies, HIT, have become increasingly common in healthcare communication. A “digital divide” between older adults and younger groups means that elderly people tend to have less internet access than other age groups. This points to the increasing need for elderly people and those who frequently interact with the healthcare system to possess a good amount of computer and health literacy. The veteran demographic use the internet even less due to various factors. In this study, researchers analyzed older veterans access to technology through mailed surveys asking for self reporting of data. The study found that veterans who lived rurally, were single, possessed less education, and/or earned less income were more likely to not have internet access. Similarly, the younger end of the older veteran group, the better educated, and the wealthier participants were more likely to use the internet. Participants without internet access typically reported being uncomfortable using the internet. A trend of computer illiteracy was found in the older veteran demographic, where very few reported being “very comfortable” with computers. This lower confidence with technology could lessen ability to interact with HIT effectively. Half of this sample was found to not have internet access, but 80% of the sample was shown to have social ties with internet access. This study shows that the possibility of social ties helping older |

| | |
|---|---|
| | veterans access the internet to use HIT is legitimate. This reliance on social ties to access medical information could bring privacy issues, but this is beyond the scope of study. The requirement for HIT tools that lessen the difficulty in adopting HIT is shown to be important to increasing positive outcomes in medical care for this demographic.<br><br>Comments:<br>Based on a convenience sample of veterans who were registered previously, this is not an ideal study. Self reporting of information regarding strength of relationships may not be accurate due to inflation or deflation of the respondents' perceived relationship ties. I found this article to be interesting, but I'm still hung up on generalizability.<br>The study didn't evaluate social tie's willingness to assist the subjects, which would determine if the divide can be solved in this way. The study suggested this as a future direction, which would be interesting to hear from next. The study also had a disclaimer about being an introductory study into the topic, so even the authors acknowledge the problems with the methodology of this study. |
| Orellano-Colón, E. M., Mann, W. C., Rivero, M., Torres, M., Jutai, J., Santiago, A., & Varas, N. (2016). Hispanic Older Adult's Perceptions of Personal, Contextual and Technology-Related Barriers for Using Assistive Technology Devices. *Journal of* | Visible disparities have been shown to exist between older Hispanic adults and older white non-hispanic adults in the U.S. Assistive Technology Devices, ATD's, have been shown to help lessen the challenges of old age. This study used the HAAT, Human |

| | |
|---|---|
| *Racial and Ethnic Health Disparities*, *3*(4), 676–686. http://doi.org.ezp3.lib.umn.edu/10.1007/s40615-015-0186-8<br><br>Jake | Activity Assistive Technology, model to describe perceived barriers to aspects of AT. AT was described as any device that mitigate individual functional limitations or increase ability to conduct daily activities. Interviews inquiring about the feasibility of the participant using various AT equipment and flashcards of prospective AT equipment were used for data collection. Some of the barriers to participants wanting to use AT equipment include: Lack of knowledge of device, safety concerns of the device, dislike for AT altogether, complexity of device, AT experienced as an obstacle, device failure, and financial restrictions, among other concerns. This study illustrates that lack of information about AT products or negative perceptions of ATD's can lead to restricted usage and access of the devices. Language barriers also exist in Hispanic geographic areas- in this case, Puerto Rico. Secondary barriers to usage, such as storage space in elderly residencies in Puerto Rico, were also reported.Taking into consideration the concerns of the consumers who would potentially use these ATD's should theoretically lead to increased usage.<br><br>Comments: This study breaks from the norm of asking older populations to adapt to ATD's; companies are encouraged to develop products that fit the needs of the consumers, which sounds ideal. A small sample size and non-random recruitment for the study make it less than ideal for statistical analysis. |
| Experimental Gerontology<br><br>Review<br>Digital technology to enable aging in place | Technology and refining of care systems allow for higher quality of life for older adults aging in place. It would be facilitated by innovations in digital technologies on diagnosis, prevention, monitor, and treatment of chronic medical |

| | |
|---|---|
| Volume 88, February 2017, Pages 25–31<br>Kwang-il Kim[a, b],<br>Shreya S. Gollamudi[a],<br>Steven Steinhubl<br>Received 22 September 2016, Accepted 16 November 2016, Available online 24 December 2016<br>http://dx.doi.org.ezp1.lib.umn.edu/10.1016/j.exger.2016.11.013<br><br>Jake | conditions. Caring for elderly populations using digital technologies could be an efficient and cost effective method. Building new systems of care around digital health technologies can be a convenient and cheap alternative to institutionalization. This review identified available digital solutions for aging in place as well as demonstrating existing evidence for the solutions given. Remote monitoring of bodily function, mobile phone applications for monitoring diabetes, and telemonitoring bodily function all were shown to be more effective than usual care in elderly populations. Frail elderly patients with multiple comorbidities were shown to have no benefit from using digital devices to manage their chronic conditions. Smartphones can be used to help determine frailty at most currently. Social isolation was found to be mediated by social networks using digital devices, but this has also been shown to exacerbate isolation as well. Devices to asses older adult stability have been shown to be accurate in testing to help prevent falls, and monitors that detect falls have been shown to be accurate during testing in the event of a fall to alert help. Simple devices can be employed to help reduce the consequences of dementia symptoms, such as wandering, forgetfulness, and cognition loss. GPS, reminders, and cognition training, respectively, were shown to help combat the aforementioned symptoms. Communication technologies such as |

| | |
|---|---|
| | video calling and musical alerts were shown to increase daily functioning for those with dementia. Barriers to implementation include financial, ethical, and complexity aspects of devices.<br><br>This review was very dense with plenty of citations to sift through on multiple topics. I thought it was the best document I had to review due to the accumulation of many conclusions on assistive technologies. Published recently so this is a good reference for up to date information. Being recent, we can see that there aren't too many devices in place; shows that the field is still developing. |
| Additional Article:<br>S. H. Tak, L. E. Benefield, D. F. Mahoney, Technology for long-term care. *Res. Gerontol. Nurs.* **3**, 61–72 (2010).<br><br>http://web.a.ebscohost.com.ezp2.lib.umn.edu/ehost/pdfviewer/pdfviewer?sid=88925514-80db-45db-81a1-a0773b2e6676%40sessionmgr4007&vid=1&hid=4206 | As the population continues to age, strain on nursing homes will increase and means of other care will become more necessary; one such method that may be implemented is the use of technology. Most technologies to aid in aging are just in stages of development right now, but there is not much evidence about how advantageous they are yet, especially in residential settings. These technologies can be worn, embedded, or placed in the environment, and their purpose is to support daily activities, enhance the quality of life, and help with safety, self-care, communication, and entertainment. Several types of technologies may be utilized to create a network, and these technologies should also provide support to caregivers. Some issues named in implementing these technologies include: awareness, acceptance, access, adoption, a lack of regulations, reimbursement, and evaluation processes. Over time, it is probable that nursing homes will begin to implement these technologies, and will most likely incorporate several in |

| | |
|---|---|
| | order to remain competitive with each other. Technology must first be seen as important and useful, however. Over time, there are many potential benefits from the addition of technology in caring for the elderly. |
| Lauriks, S., Reinersmann, A., Van der Roest, H.G., Meiland, F.J., Davies, R.J., Moelaert, F.,<br>Mulvenna, M.D., Nugent, C.D., Droes, R.M., 2007. Review of ICT-based services for identified unmet needs in people with dementia. Ageing Res. Rev. 6, 223–246.<br><br>Additional article, Jake | Those who suffer from dementia and their caregivers perceive certain needs unmet. This review looked at whether ICT (information and communication technologies) may alleviate these issues. The needs addressed in this review were general and personalized information, support surrounding the symptoms of dementia, social contact, and monitoring and safety services. Main takeaways were that simple devices aimed at alleviation of side effects were useful, while devices or techniques aimed at coping with behavioral or cognitive changes are not yet supported by the literature. Most of the ICT are centered around the carers, not necessarily the person with dementia. The study found that there is demand for a flexible, personalized support system for care. |
| Other Additional Article:<br>M. Rowe, S. Lane, C. Phipps, CareWatch: A Home Monitoring System for Use in Homes of Persons With Cognitive Impairment. *Top. Geriatr. Rehabil.* **23**, 3–8 (2007). | Informal caregivers provide the bulk of care to people with cognitive impairment. The sleep cycles of those with cognitive impairments are usually quite different from those of their caregivers, resulting in unsupervised activity at night; caregivers then do not sleep for sufficient periods of time due to waking up to care for the subjects. A monitoring system can remedy this issue. They identified existing technologies and tried to configure them to fit the needs to ease the burden on caregivers but found that this was more difficult than anticipated. Their solution was to create a panel with a receiver and various sensors; special software was also written to supplement this. The system was designed to be easy to use (no previous technological experience was necessary). Each system was also individualized depending on the needs of the caregiver. |

| | |
|---|---|
| | Trials of this study were conducted in homes of people with dementia and also in the homes of children with cognitive impairment. This system was designed to supplement the care provided by the caregiver and also improve the quality of life of both the caregiver and the care recipient. |
| | |

## Effectiveness of Assistive Technology and Environmental Interventions in Maintaining Independence and Reducing Home Care Costs for the Frail Elderly- Kristin

There has not been a lot of research done on the effectiveness of assistive technology devices (canes, bath benches, ect.) or environmental interventions (ramps, ect) even though much of the elderly population relies on these tool. This study aimed at examining at the effectiveness of an intervention program involving these methods through a randomized controlled trial. Only participants who scored above 23 points on the mini-mental state examine were included in this study in order to try and exclude persons with dementia. Independence defined as the "ability to take responsibility for one's own performance and desires" was measured with the use of ATs and EIs. The study followed the participants for a year and a half, with followups every 6 months. Both groups showed decline in social integration, but only the control showed an increase in pain and mobility decline. Overall both groups showed decline in functional status, however it was much greater for those in the control group.

Mann, W. C., Ottenbacher, K. J., Fraas, L., Tomita, M., & Granger, C. V. (1999). Effectiveness of assistive technology and environmental interventions in maintaining independence and reducing home care costs for the frail elderly: A randomized controlled trial. *Archives of Family Medicine*, *8*(3), 210.

## Family caregiver training is needed to improve outcomes for older adults using home care technologies -Kristin

Older adults make up the highest percentage of people that use home enteral nutrition due to of the high percentage of older adults unable to obtain a normal body weight. This type of care in the elderly requires a lot of time and education. There are many complications with tube feedings when they are not properly used such as infections, pulmonary complications, bacterial contamination, tube displacement, and psychological issues. Caregivers can be very helpful in reducing these complications when trained properly. It is important that caregivers are trained properly because family caregiving has increased tremendously in the past 20 year, and has

been a good source of both physical and mental support for their elderly family members. These caregivers commonly experience stress and exhaustion from the burden of learning new technologies, and altering their normal daily schedules. Education on the management of home medical therapies is essential for both the caregiver's health and the patient's health, but sadly most caregivers have not been given proper training. Educational interventions for caregivers have shown to increase knowledge and skill, increase healthy habits, and decrease isolation.

Silver, H. J., & Wellman, N. S. (2002). Family caregiver training is needed to improve outcomes for older adults using home care technologies. *Journal of the American Dietetic Association*, *102*(6), 831-836.

## Factors affecting home care patients' acceptance of a web-based interactive self-management technology -Kristin

Consumer health information technologies (CHITs) are patient focused technology applications that promote a patient's well being and usually provide them with methods of self care. This study focuses on assessing a technology acceptance model known as The Unified Theory of Acceptance and Use of Technology (UTAUT). Researchers examined acceptance and perceived effective use, effort expectancy, social influence, and facilitating conditions in elderly patients living at home that had a diagnosis of chronic cardiac disease. They were given access to an online technology to help them manage their cardiac disease over a span of 4 weeks. Participants who believed using the technology would enhance their quality of life and ease their daily schedules were much more likely to use the technology. Surprisingly perceived ease of use, and social influence (subjective norm) did not directly have an effect on whether participants chose to use the technology or not. This being said they did indirectly have an effect if the participant believed the technology would be useful in their life.

Or, C. K., Karsh, B. T., Severtson, D. J., Burke, L. J., Brown, R. L., & Brennan, P. F. (2011). Factors affecting home care patients' acceptance of a web-based interactive self-management technology. *Journal of the American Medical Informatics Association*, *18*(1), 51-59.

## Perspective: Older Adults' Adoption of Technology: An Integrated Approach to Identifying Determinants and Barriers -Kristin

Technology has found to be extremely beneficial in helping older adults with their daily lives, however many are not very willing to use these technologies. Other literature was reviewed in order to determine the factors that affect how and if older adults will use them. Designing technology for elderly adults tends to be especially difficult considering the large age gap between the designers and the consumers. The ten most important factors in decision making appeared to be value, usability, affordability, accessibility, technical support, social support, emotion, independence, experience, and confidence. Perceived usefulness and potential benefit

is especially important in older adults because they tend to use technology to obtain a desired outcome. They are much less likely than young adults to use technology if they do not see a potential benefit. Successful communication of the technology's advantages is also a beneficial way to get an older adult to adopt the tool, especially when the technology may appear to cost more. Emphasizing the economic benefits may be the key to adoption with more expensive products in this population. It is also important to consider how age causes a large amount of physical and cognitive decline. Because of this it is necessary that technologies aimed at older adults are easy to use. It should not have too many features, options, or information, and it should look familiar to the recipient. Finally, it is essential to educate older adults on technology the are receiving in order for them to be willing to use it. Since they did not grow up in an age where technology was widespread they may not have even the simplest training. The lack of knowledge and training may cause anger, frustration, and anxiety, which in turn could deter their use even further.

Lee, C., & Coughlin, J. F. (2015). Perspective: older adults' adoption of technology: an integrated approach to identifying determinants and barriers. *Journal of Product Innovation Management*, *32*(5), 747-759.

**I found this paper to be the most beneficial out of the 4 that I read. I thought it was very informative

For Kristin to review: https://www.ncbi.nlm.nih.gov/pubmed/25165042

## Advancing the Aging and Technology Agenda in Gerontology

Technology is known as something that is made to help make a part of life easier. Early work in the area of gerontology and technology was carried out in the United States and Europe in the 1980s. Despite the large amount of research and efforts that has been put into understanding the relationship, there is still a very large gap in knowledge. It is important to have a universal definition in the way in which quality of life technologies are organized. Without an organizational system no progress will be made in technology production and adoption. When a designer is producing these technologies, they should be considering the population's physical and mental health, mobility, social connectedness, safety, and daily activities and leisure. Quality of life technologies can be useful in monitoring an individual, diagnosis/identification of a problem, and treatment. Most of the research that has been done has been focused mostly on technologies that help the life of the older adult. These studies, which are commonly known as, telemedicine, have commonly shown positive results. Unfortunately, the quality of the studies done tends to be low, and randomized control trials in this area tend to be rare. This is because these studies tend to take a longer period of time, and technology advances more quickly than researchers can keep up with. Overall, collaboration between designers, researchers, doctors, ect., on quality of life technology is immensely challenging but essential for effectiveness.

**Theories:**

The social emotional selectivity theory: with increasing age people become more selective and aim to do things that will maximize benefits and minimize risks

The selective optimization with compensation theory: promote growth and maintenance of functioning as we age. Optimize potential and compensate for lose.

The motivational theory of life-span development: adaptive development depends on how much the individual realizes control of their environment)- ability to change unattainable goals to more attainable ones.

Schulz, R., Wahl, H. W., Matthews, J. T., Dabbs, A. D. V., Beach, S. R., & Czaja, S. J. (2014). Advancing the aging and technology agenda in gerontology. *The Gerontologist*, gnu071.

Cross-referenced- Kristin Harrison:

Telecare has been used to help frail people to be able to live independently, however not many studies have been done to determine the efficacy of these interventions. In this study, each participant was given a pendant alarm and various other devices. These devices include lifeline units such as epilepsy sensors and fall detectors, monoxide and smoke detectors, and infrared movement sensors. Participants were included if they had a minimum level of social care service, mobility difficulties, a history of falls, cognitive impairment, or a carer that is facing difficulties. The goal was to see the amount of people that experienced an inpatient hospital admission within 12 months. There was not a significant difference in hospital stays between the intervention group and the control group.

Steventon A., Bardsley M., Billings J., Dixon J., Doll H., Beynon M., Hirani S., Cartwright M., Rixon L., Knapp M., Henderson C., Rogers A., Hendy J., Fitzpatrick R., & Newman S. (2013) Effect of telecare on use of health and social care services: findings from the Whole Systems Demonstrator cluster randomised trial. *Age and Aging. 42*(4): 501-508.

Cross referenced article-Megan

**Factors influencing acceptance of technology for aging in place: A systematic review**

This article is a systematic review that evaluates 16 articles in order to determine some of the most common and influential factors that can inhibit older person's accepting technology. The majority of the articles were evaluating technologies that improve social interactions and safety in a home environment. These factors, mainly preimplantation (14/16), were then divided into 6 categories:

1. Concerns regarding technology
    a. Cost,
    b. privacy,
    c. ease of use
2. Expected benefits of the technology
    a. Perceived usefulness,

    b. safety
3. Need for technology
    a. Perceived need
    b. Health status
4. Alternatives to technology
    a. Help from family members/spouse
5. Social influence
    a. How likely the family/friends will support the use of technology
6. Characteristic of older adults
    a. How willing are they to remain in their home while they age

The review also touches on the fact that there are very few post-implementation studies and that the post-implementation studies that do exist are not quantitative. (Pretty sure they are talking about how these factors are interrelated) In order to increase the likelihood of an older adult using the technology it is important to reduce their concerns about the technology which can be done by allowing the older adults to test out the technology in a risk free environment and by allowing the older adults family members/friends to test out the technology too. In addition to reducing the older adults concerns it is also important that the older adult understands the possible benefits of the technology which tends to be a secondary goal.

This article discussed an interesting point that I have not really considered before or seen discussed in other articles. They talked about how another barrier to an older adults use of technology is if there are other options that can provide the adult with a similar amount of help. Another option could be the help of family members or friends instead of using a home technology system to help with ADLs.

Peek, S., Wouters, E., van Hoof, J., Luijkx, K., Boeije, H., & Vrijhoef, H. (2014). Factors influencing acceptance of technology for aging in place: A systematic review. *International Journal Of Medical Informatics*, *83*(4), 235-248. http://dx.doi.org/10.1016/j.ijmedinf.2014.01.004

Cross reference #2-Megan

## Can Aging in Place Be Cost Effective? A Systematic Review

This article is a systematic review discussing how to successfully implement technology into an older person's home as cost efficient as possible. There are a total of eight articles (5 randomized control and 2 quasi-experimental studies and 1 retrospective matched comparison study) from North America discussed in this paper. The paper mentions that many older adults wish to age in their homes as opposed to an assisted care facility (common knowledge between us at this point but still good to see another article support this claim). The paper divides the assisted living technologies(ATLs) into two categories:

1) Home and Environmental Technologies
    a) Tools that can be installed into the home in order to improve daily living (safety or improving mobility
    b) Ramps
    c) Modified kitchen tools

    d) Rails in bathroom/shower
2) Telemedicine
    a) Technology that can help older adults communicate with care/health professionals
    b) Home surveillance
    c) Life alert

So far most of the articles we have discussed during our weekly meetings have been focused on how to improve ADLs for older adults yet it is very important that these technologies are cost effective as well. The article discusses an increased need for studies evaluating the economic benefits of ATLs as that is also a major factor in getting older adults to use these technologies. Also since new technologies are always being created the cost of "older" technologies is constantly changes which also makes it difficult to evaluate the cost effectiveness of ATLs.

**Toward a psychological science of advanced technology design for older adults**

Technology can be extremely beneficial in many aspects, however in some situations it can cause more problems and frustrations. Although older people are less likely to adopt new technology than younger people, once they do adopt it they tend to use it just as frequently. The goal of technology research in the elderly is to explain why these differences exist. A model that is commonly used is known as the CREATE model of aging and technology which takes into account the individuals and their environment. The types of technologies that are normally researched are input devices, output devices human-computer interfaces, and training programs. They are looked at for the safety, health and wellbeing of older adults. In order to develop technologies we should be looking to identify the source of usability difficulties, assess the current trainings, and examine needs that are not already being met. They should be especially focused on what the technology should be doing. The most work that needs to be done focuses on ambient technologies- technologies that are sensitive and responsive to the presence of people. This study looks into collaborative machine assistants (CMAs) such as robots, but not their effectiveness.

Rogers, W.A., & Fisk, A.D. (2010). Toward a psychological science of advanced technology design for older adults. *The Journals of Gerontology, 65*(5), 645-653.

## Technology acceptance and quality of life of the elderly in a telecare program-Megan

This article is evaluating the variables involved in implementing a successful telecare program in older adults in Taiwan. The use of a telecare program can provide older adults with improved communication to health care professionals and social services. There are three main categories that the researchers divided the telecare programs into: vital sign monitoring, safety/security monitoring and information/support services. The telecare devices implemented

in this study was a device that monitor physiological health, videos to help with daily activity and health, medication reminder, an evaluation tool, and 24 hour emergency care. Researchers evaluated the variables using a cross sectional study and administering a survey, both multiple choice and open ended, to the older adults. Those who reported the highest quality of life used the technology frequently, had a high social welfare status, and better health conditions. The study also showed a correlation between older adults who perceived the telecare technology to be beneficial and willingness to continue the use of the telecare technology. There was also a better perception towards quality of life. Cost still remains a large factor of technology use.

CHOU, C., CHANG, C., LEE, T., CHOU, H., & MILLS, M. (2013). Technology Acceptance and Quality of Life of the Elderly in a Telecare Program. *CIN: Computers, Informatics, Nursing*, *31*(7), 335-342. http://dx.doi.org/10.1097/nxn.0b013e318295e5ce